

Abstract Submitted  
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**Size dependent suppression of superconductivity in granular mesoscopic Nb islands** MALCOLM DURKIN, University of Illinois at Urbana-Champaign, SARANG GOPALAKRISHNAN, Harvard University, RITA GARRIDO MENACHO, NADYA MASON, University of Illinois at Urbana-Champaign — While the suppression of superconductivity has been studied in bulk, 2D, and 1D systems, it remains largely unstudied in systems of mesoscopic granular islands. We investigate critical temperature ( $T_c$ ) suppression in mesoscopic granular Nb islands as a function of island diameter. By performing transport measurements, we find that superconductivity is suppressed at diameters considerably larger than the coherence length of Nb. This behavior cannot be explained by competition between charging and Josephson energies. Instead, variations in island  $T_c$  for fixed diameters suggest that the onset —and suppression— of superconductivity may be determined by rare region effects.

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